Cigarette Emissions Results from the 1999 Massachusetts Benchmark Study

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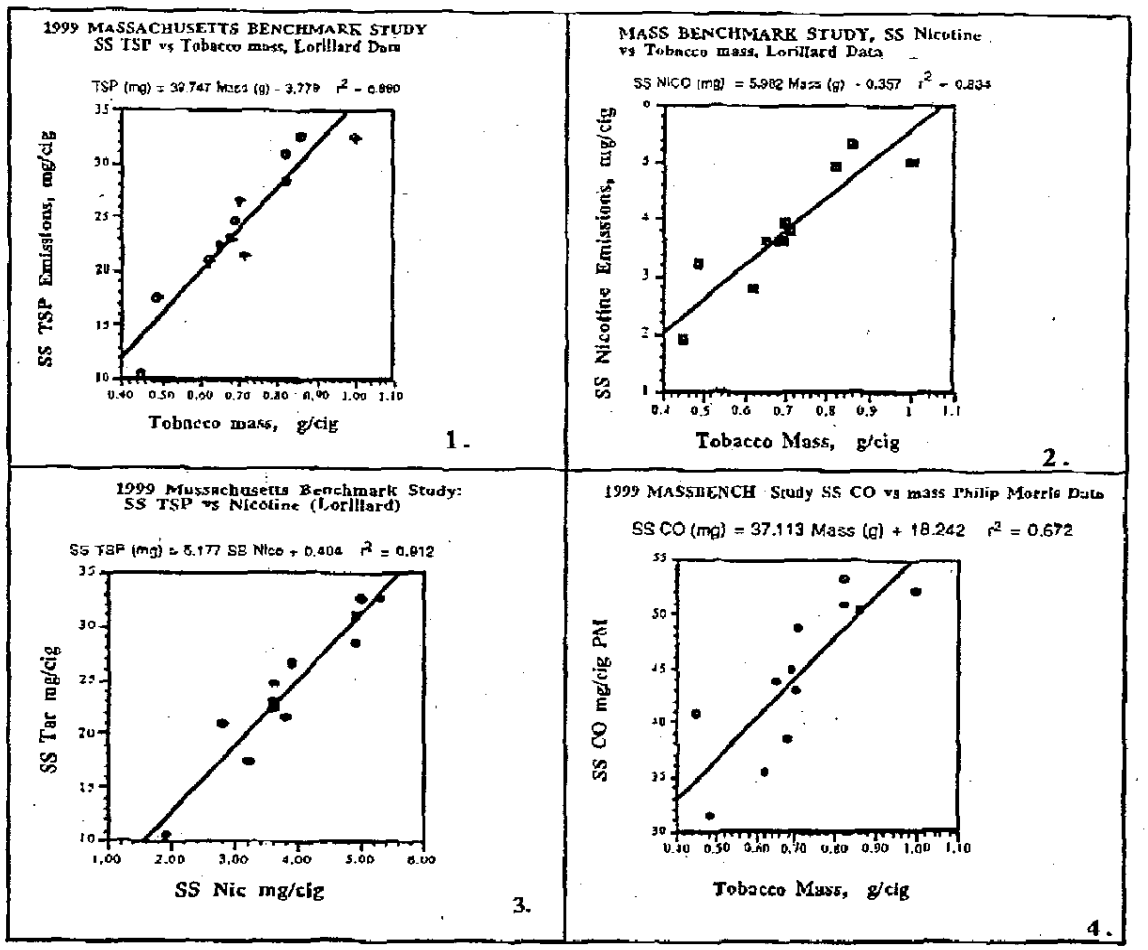

Figures 1-4. Data measured by the tobacco industry for the Massachusetts Department of Health in 1999 for 12 brand styles said to be representative of the Massachusetts marketplace in 1998, and adequate to characterize sidestream emissions. Sidestream (SS) TSP, Nicotine, and CO all vary linearly with the mass of tobacco burned. TSP and Nicotine also vary linearly with each other. The cigarettes were machine-smoked and the emissions collected in a "fishtail chimney." Data for the 12 brands shows that tobacco mass averaged 0.71 g (sd, 0.15 g); SS TSP averaged 24.34 mg/cigarette (sd, 6.51 mg/cig); SS nicotine averaged 3.875 mg/cig (sd, 1.01 mg/cig). SS CO averaged 44.5 mg/cig (sd, 6.96 mg/cig).

Data presented in the literature shows for human smoking, 6 studies ETS-RSP averaged 13.87 mg/cig, two studies of TSP yielded 21.4 mg/cig, and 4 studies of machine-smoked RSP yielded 14.4 mg/cig. This suggests that a significant fraction of ETS may appear as PM_{10} or TSP. Data submitted by RJR to OSHA reported that ETS nicotine emissions are 1.8 mg/cig, whereas SS emissions above are 3.9 mg/cig, suggesting that a significant amount of ETS nicotine may be lost due to chemical reactions or by sorption. ETS concentrations are typically modeled by ignoring individual cigarette variations and assuming constant emissions.